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INTELLIGENCE TESTS

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This summary covers the year 1933, together with some earlier references omitted in previous summaries.

General. The most notable contribution of the past year to the general field of intelligence testing is the work of the Scottish Council for Research in Education (141). This work presents the first adequate survey of the intelligence of any nation. A group verbal intelligence test was given to all children in Scotland born during 1921, thus obtaining a cross-section of the intelligence of the whole country. A total of 87,498 children of C.A. 10.5 to 11.5 was tested, and median scores by months are given, showing a monthly growth of about three-fourths of a point in score. The relation of the group test to the Binet was obtained by testing a sampling of 1,000 cases on both tests. Converting the group scores to Binet I.Q.'s gives an average I.Q. of 100 for both boys and girls, but the S.D. for the boys is 17, and for the girls 16. The number of average intelligence (between 90 and 110 I.Q.) is less than 50 per cent, approaching more nearly 45, and thus we have a larger number above and below than has been usually assumed. If an I.Q. below 70 be considered indicative of mental deficiency, the percentage of this group is between 1.5 and 3 per cent. By this appraisal of the intelligence of Scottish children the way is opened for truly national comparisons when other countries conduct similar national surveys.

Boynton (16) covers the whole field of intelligence tests and their uses in his book. He points out the value of performance and non-language tests. Garrett and Schneck (48) include two chapters on

intelligence tests in their manual of psychological tests, and Long (86) considers performance tests of intelligence in his book on vocational tests. Mental tests standardized for South Africa are described by Skawran (148).

Several chapters bearing upon intelligence tests appear in the revised edition of Murchison's *Handbook of Child Psychology* (103). Chapters on intelligence appear in the general textbooks by Pressey (123), Arlitt (2), and Jersild (64).

The most complete bibliography of mental tests has been arranged by Hildreth (59), and Pintner (117) covers the work for 1931 and 1932 in this journal.

The Meaning of Intelligence. Jones (67) gives a brief and concise survey of the Spearman theory and its various modifications. Piéron (116) discusses various aspects of intelligence, noting that intelligence is "a judgment of value," and enumerating four different types of intelligence, namely, general, verbal, logical and numerical. How intelligence operates in the process of reasoning is considered by Claparède (26) in his experimental work on the origin of the hypothesis in the thought process. By the use of Hotelling's method of factor analysis, Smith (149) finds a general factor, multiple overlapping group factors of various degrees of potency and specific factors. Similarity in content or material seems more influential in causing group factors than does the mental process involved in solving the test, *e.g.*, generalizing, finding analogies. Tryon (158) and Tryon and Jones (159) deal with the relationship between speed and altitude, finding a correlation of about .5.

Relation of Intelligence to Other Factors. Maller's (90, 91) comprehensive investigation in New York City is an outstanding contribution to psychology and sociology. Using the city-wide survey of intelligence in the fifth grade he computes I.Q.s for 275 areas. Intelligence correlates $+.7$ with school progress, $-.6$ with juvenile delinquency, $-.5$ with infant mortality, and so on. The value of this type of study combining psychology and sociology is obvious, and the possibilities for extension are great.

Further evidence of the lack of correlation among college students between intelligence and the standard personality inventories, such as the Thurstone and Bernreuter, is contributed by the work of Stagner (152) and of Hertzberg (57). Pintner (118) gives correlations between intelligence and the six measures on the Vernon-Allport Values Test, the highest being $-.41$ with economic interests. Landis and Ross (80) find no correlation between intelligence and

their measure of humor. A pleasing personality correlates $+.42$ with mental age among high school girls, according to Fleming (45). Weber (163) finds that intelligence and emotional age correlate $+.8$ for 235 children in Grade VI. Kinter (74) gives correlations between intelligence and various character tests translated and used with French children. Harriman (53) measures ethical discrimination among delinquent women and finds it highly correlated with intelligence.

Among college students intelligence correlates $+.45$ with a liberal score (Salner and Remmers, 135), $-.26$ with prejudice (Sinclair and Tolman, 146), and $-.37$ with unfavorable attitude toward internationalism (Kolstad, 76).

Fritz (47) finds the correlation between intelligence and marks in a teachers' college to be $+.53$. Bixler (14) investigates the school marks of pupils in twenty-four high schools in the same city and finds great variations among schools from the point of view of the intelligence of the pupils receiving a given grade. He concludes that grades are too variable to be of much value for college entrance, and that intelligence tests are better. Richards (128) follows up 326 children tested in Grade I in 1924 and finds that school progress correlates $+.41$ with I.Q. in Grade I and $+.55$ with I.Q. at time of investigation. Quercy (124) in France discusses the problem of pupil classification. He finds intelligence and teachers' judgments of intelligence to correlate positively from $+.28$ to $+.72$.

Objective-type tests correlate higher with intelligence than do essay-type tests, according to Gilliland (49). The usual verbal group test of intelligence penalizes poor readers, according to Durrell (39). For poor readers with an average Binet I.Q. of 107, the group test I.Q. is 99; for superior readers with a Binet I.Q. of 92, the group test I.Q. is 109. In a study of reading and perception tests among university students, Litterer (85) finds correlations between intelligence and reading to range from $.41$ to $.73$, and between intelligence and visual apprehension from $.18$ to $.44$. A study of the language development of children by means of their writings shows, according to La Brant (77), that the percentage of subordinate clauses used by them correlates higher with C.A., $+.41$, than with M.A., $+.29$. Attention, as measured by the time spent in a given activity by preschool children, shows a low positive correlation with intelligence, according to the work of Shacter (143). Maller and Zubin (92) find that motivation, in the form of urging a child to beat

the child above him, leads to no greater gain in intelligence test scores than does simple repetition of the test.

The relation of intelligence to certain physical factors is dealt with in three reports. Schell (137) finds no evidence of the influence of infection by intestinal protozoa on the I.Q. of matched groups of infected and non-infected siblings. Practically zero correlations are reported by Patrick and Rowles (113) for college women between intelligence and such factors as blood pressure, vital capacity, basal metabolism, etc. Among preschool children Wagner (162) reports a correlation of $-.71$ between M.A. and amount of sleep during twenty-four hours. The more intelligent seem to spend less time in sleep.

Growth and Regularity of Growth. The interest in the general curve of growth of intelligence continues, and the most valuable contribution of the past year is by Jones and Conrad (66). They tested practically the total population of 19 villages, obtaining a group of 1,191 cases ranging in age from ten to sixty. They find a very rapid linear increase in intelligence from ten to sixteen, slowing down to a peak between eighteen and twenty-one, and then a slow decline to age fifty-five, which is equal to about age fourteen. They believe the decline after age twenty-one is a true decline of intelligence and is not due to faulty sampling of cases, faulty administration of the test, lack of motivation or such factors as speed, hearing or vision. Sorensen (151) studies the adults in extension classes at a university ranging in age from fifteen to seventy. He finds that vocabulary increases with age, while paragraph reading remains constant. He criticizes the conventional mental test as being unfair to out-of-school adults. Miles (98) discusses his previously reported work on the abilities of older men from the point of view of personnel administration. The growth curve, based upon tests given to about 12,000 school children, is, according to Richardson and Stokes (129), a G curve with the point of inflexion at four years, and at age eighteen about 96 per cent of intellectual maturation has taken place.

Various aspects of the problem of growth during the early years of life are discussed in the following seven reports. Bayley (10) describes the growth of intelligence for the first three years of life. She finds very low correlations between earlier and later tests, although scores become more consistent as the children grow older. Driscoll (38) finds that re-test correlations on the Kuhlmann-Binet and Merrill Palmer gradually decrease as the time interval between tests increases. The correlation between Kuhlmann-Binet at age two

or three and the Stanford-Binet at age five or over is $+.66$. Updegraff (161) finds re-tests before school entrance to correlate about $.53$, whereas re-tests after entrance to school correlate $.83$, and concludes that I.Q.s of preschool children are very unreliable. Mowrer (102) supports this view to some extent by a study of re-tests on the Stanford-Binet and Minnesota Scales. On the average we may expect a change in I.Q. of 12 points for children under five years of age re-tested after an interval of 6 to 24 months. Wellman's (164, 165) analysis of the effects of preschool attendance comes to the conclusion that the I.Q. is increased by preschool attendance, whereas Kawin and Hoefer (73) find no such influence on the Merrill Palmer test in a comparison of 22 pairs matched for attendance and non-attendance at a nursery school over an interval of 7 months. In general, therefore, we may say that the I.Q.s of preschool children are rather unstable, but that investigators differ as to the cause of this instability.

Nemzek (106) summarizes the literature on the constancy of the I.Q. presenting a bibliography of 247 titles. A distribution of 97 re-test correlations for the Stanford-Binet shows a median r of $.83$, while 27 re-test correlations for group tests show a median of $.85$. Taking previous results of Binet re-tests, Thorndike (155) shows the constant decrease of the correlation with increase in time interval between tests. This decrease is from a correlation of $.89$ at 0 months to $.70$ at 60 months. Very similar results are shown by Brown (21) for 124 cases tested many times, although even after an interval of 9 years he obtains a correlation of $.78$. Lithauer and Klineberg (84) report a re-test correlation of $.76$, and they find the mean I.Q. increases after residence in an institution for dependent children. They believe that the favorable influence of the environment is shown in this increase. Because the re-test correlation is $.84$, Jordan (70) believes that student examiners can conduct reliable tests on the Stanford-Binet. Children below age six at the time of first testing show larger changes in I.Q. than those above age six. Lincoln (83) finds that children with I.Q.s above 119 when first tested in Grade I or Kindergarten tend as a whole to lose about 3 or 4 points when re-tested 5 to 8 years later, and such loss is more characteristic of girls than of boys. Nemzek (107) takes the Hollingworth data on 52 gifted children and shows that although there is a systematic error on the Herring test, the constancy of the I.Q. for the Herring test ($.73$) is just as good as for the Stanford test ($.68$). Hirsch's data for 160 cases tested annually for 6 years are

used by Miller (99), who gives a distribution of the 2,400 I.Q. differences. He compares the correlation of I.Q.'s over the six-year period, with those between 5 tests given on the same day. The averages and ranges of the resulting correlations are practically identical. Wolcott (169) finds that the re-test correlation for the Thorndike Intelligence Test after an interval of 3½ years to be .81. The average gain from freshman to senior is 60 points.

Some Techniques. Two studies deal with the Heinis Personal Constant as a substitute for the I.Q. Cattell (23) finds no advantage of the Heinis Constant over the I.Q. after comparing these two values on three groups of children who were given repeated tests over an interval of 8 years. Hilden (58), however, finds the Heinis Constant more stable than the I.Q. for cases of low I.Q. The re-test correlation for the Heinis Constant is .83 as compared with the I.Q. re-test of .77. The I.Q. decreases with the interval between tests, whereas the Heinis Constant remains the same. For superior children Cattell found the reverse to be the case. Humm and Humm (61) point out that neither the I.Q. nor the M.A. alone is adequate for classification of children in school. They, therefore, propose a combination of these two values into a coefficient of rank.

Individual Scales and Tests. One new scale has been published. This is the California First-Year Mental Scale constructed by Bayley (9) made up of tests used by previous investigators in this field. It seems the most thorough attempt to produce a standardized method of procedure and scoring at this early level that has so far appeared. The method of standardization of the Arthur Performance Scale has now been published by the author (5). There are detailed results for each test. In England Cattell and Bristol (24) report on a battery of eight tests suitable for children from ages four to eight. In Germany Wreschner (173) reports on a series of tests for six and seven year olds. The tests are of the performance type, but the child is also asked many questions about the tests during the examination.

Four studies deal with particular aspects of the Binet tests. By analyzing the results of 1,306 tests, Phillips (115) rearranges the tests in order of difficulty for each of three grades, namely Grades III, V and VI. Skalet (147) also makes a statistical study of passes and failures by a group of normal children. Louden's (87, 88) two studies deal with the Stanford-Binet Vocabulary Test. List I is easier than list II at the lower levels but harder at the upper levels. A comparison of the scores of bright children (average I.Q. 121)

with those of dull children (average I.Q. 70) of the same mental level shows equality on the two vocabulary lists.

Porteus (122) sums up results on his Maze Test. He finds it of decided value as a measure of social or planning ability. He believes the test little influenced by cultural factors and hence very good for the investigation of racial differences. Bradbury (17) gives the results of the application of the Descoeudres tests to 57 four- and five-year-olds. The correlation with the Stanford-Binet is .56. A report on the application of the Pintner-Paterson Performance Test to French children is given by Nassri (105). Reymert and Hartman (126a) report in detail on the Knox Cube Test.

Group Tests. The latest edition of the Ohio State Psychological Test by Toops (157) requires the subject to punch his answers on an answer pad. Scoring is rapid and easy and the test blanks may be used over and over again. In French we have reports of two new group tests of the conventional type, one by Lahy (78) and one by Foucault (46). Foucault gives details of the standardization of his test and norms for ages three to twenty-one. He finds the usual correlations with Binet, teachers' judgments and school marks. A Norwegian translation and adaptation of Dearborn's Group Test for ages six to eight has been prepared by Pedersen (114).

Several reports deal with comparisons of existing tests. Turney and Fee (160) compare five group tests and rank them in order according to 29 criteria. They believe the Otis SA Intermediate and the Terman Group Test to be the best for use in junior high school. Charles (25) finds the Kuhlmann-Anderson to be more like the Binet than is the Otis Test. Armstrong (3) compares Army Beta, Army Performance and Otis, and feels that the Beta should be re-standardized for use with children. Hunsicker (62) gives a useful table for equating scores on the Thurstone Psychological Examination and the Thorndike Intelligence Test.

The School Pupil. The debated problem of homogeneous grouping receives extended treatment by Billett (12, 13) in two studies. In the first study, he analyzes 140 articles dealing with this problem. He finds only four thoroughly controlled experiments and the results of these show two in favor of, one doubtful and one against homogeneous grouping. Of 108 other studies, 91 are in favor of ability grouping. In the second study he gives the results for homogeneous and heterogeneous sections taught by the same teacher, and finds that slow and average pupils gain more in homogeneous sections, while fast pupils gain more in heterogeneous sections. West's (166)

study surveys different types of ability grouping in many cities in grades III to VII. Definite reduction of variability and overlapping takes place where a multiple track plan is in effect. The percentage of pupils needing individual adjustment is less where ability grouping is practised. Barthelmess and Boyer (8) find that all three types of pupils, low, medium, and high, gain by being grouped according to intelligence tests.

Two reports by Wood (170, 171) give the results for intelligence and achievement testing in private schools. The high mentality of pupils in these schools is again indicated by the fact that about 85 per cent of these high school seniors are above the average score of public school seniors, and 70 per cent are above the average score of college freshmen. The median I.Q. of 3,674 children in grades IV to VIII is 115. Woody (172) reports the results of a testing program in a small city, and Broom and De Silva (19) show correlations between intelligence and achievement tests for junior high school pupils. Portenier (121) believes that a decrease in the I.Q. of high school pupils is taking place. The number of pupils with I.Q.s below 85 going to high school is increasing. She compares a group of such cases with I.Q.s from 70 to 85 with a control group having I.Q.s from 99 to 129.

In England Collier (28) shows that the intelligence test part of the examination for the selection of secondary school pupils is more effective than the achievement part. The intelligence test score correlates about .5 with the principals' rating of the students as suitable for secondary school work, three to five years after taking the intelligence test. Four reports from Germany show much the same type of work being done there as in this country. Kahlert (72) uses the new Norden revision of the Binet test. He recommends much more testing in the schools. Zietz (175) gives several intelligence tests to a small class and finds a correlation of these with the teacher's judgment of .86. He believes the tests form a valuable supplement to the teacher's judgment. Lämmermann (79) gives achievement and intelligence tests and reports their inter-correlations. He discusses the advantages of homogeneous grouping. Reifenrath (126) compares different types of schools on a general intelligence test and finds the gymnasium ranking highest, and the commercial and trade schools ranking lowest.

The College Student. Moore's (100) study of high school graduates, who are two years younger than the average, shows that this young group is decidedly higher in general intelligence. A follow-up

of their work as sophomores and seniors shows them still superior in intelligence and achievement to their older college classmates. She concludes that it is no handicap for the gifted child to enter college at age fifteen or sixteen. The intelligence of adults in university extension classes is dealt with at length by Sorenson (150). He finds a steady increase in intelligence score from age fifteen to fifty-four, and attributes this increase to selective influences. Women score higher than men, but the test is mainly one of vocabulary. On the whole the distribution of intelligence for extension students is very similar to that for college freshmen. The College Entrance Board (27) presents its eighth annual report on the scholastic aptitude test. Scores on the verbal part of the test correlate .40 with standing at graduation four years later, while scores on the mathematical part correlate .53. Held (56) gives many correlations between intelligence and other tests with first year marks and Segel and Gerberich (142) present correlations between various parts of the American Council Test and first semester marks. Nemzek (108) gives 34 correlations between various intelligence tests given to college students. They vary from .10 to .82. From the results of the Wisconsin cooperative testing program Jordan (71) shows that students going to the state teachers' colleges score much below those going to the University of Wisconsin. Moss (101) reports on his scholastic aptitude test for medical students, and believes that the test predicts work in medical school better than do school grades or pre-medical scholarship. A brief history of testing at the college level is given by Bowen (15), who emphasizes the importance of individual testing and the clinical point of view.

The Superior. Four studies deal with the child of high I.Q. Cattell (22) finds that the Stanford-Binet I.Q.s of such children tend to increase rather than decrease, as reported by Terman, after an interval of five or more years. From a distribution of 400 cases coming to a psychiatric clinic, Schott (138) finds that 19 per cent have I.Q.s above 110. Of these superior children 62 per cent have school maladjustments. Personality and emotional difficulties are more common than academic difficulties. Scheidemann (136) presents a survey of 22 children of high I.Q. in a special class, and finds them rather below average both physically and emotionally. Sylvester (153) presents case studies of several gifted children.

The Feeble-minded and Dull. Doll (37) discusses the whole problem of the feeble-minded. He estimates that 2 per cent of the population are feeble-minded, but only 10 per cent of the estimated

number are being cared for in institutions in New Jersey. Idiots and imbeciles should be cared for in institutions and morons should be educated in special classes in the public school system. The two reports by Dayton (33, 34) give figures for the traveling clinics in Massachusetts. He estimates that 3.3 per cent of children entering school each year are mentally defective. The average I.Q. for 20,473 cases tested by the clinics from 1921 to 1930 is 71.7. The average I.Q. of 3,941 cases now in state schools is 45. An analysis of 3,498 cases on the institution waiting lists reveals more male than female idiots, *e.g.*, 14 per cent males, 11 per cent females below I.Q. 30. Fick's (42) survey in the Union of South Africa results in an estimate of 0.79 per cent mentally defective and 8.91 per cent subnormal (below 80 I.Q.). The rural districts show much larger percentages of both these types than do the towns.

Shimberg and Reichenberg (145) give a very optimistic report of the success of 189 subnormals in the community. They believe that defectives can be treated so as to be "a positive asset" to the community. Murphy (104) gives an analysis of the cases brought to a university psychological clinic from 1912 to 1931 and shows how the percentage of feeble-minded gradually drops from 40 to 15 per cent, thus indicating a change in public attitude toward the work of the clinic. Arthur (6) shows the high reliability of the Kuhlmann-Binet for feeble-minded cases from a study of 1,207 re-tests. The most doubtful I.Q.s are those of infants with delayed speech.

From a study of 2,306 special class children with I.Q.s below 80, Witty and Beaman (168) find that the order of frequency and the preference for different kinds of play are very different from those of normal and superior children. Page (112) finds the mechanical ability of subnormal boys (average I.Q. 73) as measured by the Minnesota Spatial Relations Board to be much below that of normals. Their scores correlate much higher with M.A., and he concludes that form-boards may be tests of intelligence up to a certain level. In manual dexterity (hand-eye coördination) the feeble-minded are not much below the normal, according to Holman (60). Rosenstein (132) presents three case studies of children who are almost feeble-minded. Liefmann (82) in Germany compares repeaters with normal cases, and finds them to be poorer on intelligence tests as well as on many other kinds of tests.

Delinquents and Problem Cases. Zeleny (174) analyzes 163 studies dealing with the intelligence of delinquents of all sorts, and finds that lack of agreement as to the amount of feeble-mindedness

among such groups is due to different standards for mental deficiency. He concludes that feeble-mindedness is slightly more common among criminals to the extent of 3.8 per cent feeble-minded among delinquents as contrasted with 2.1 per cent feeble-minded in the general population. Armstrong (4) presents the I.Q.s for different groups of delinquents in New York City. Children of foreign-born parents have lower I.Q.s. She discusses problems of immigration as related to delinquency and mental defect. After testing 300 inmates of a state farm prison, Ricker (130) calls 68 per cent subnormal, having M.A.s below 12. Conrad (30) on the other hand finds his 1,206 cases in a United States reformatory to have a median score on the Army Alpha equal to that of the drafted men during the war. Three studies of juvenile delinquents are contributed by McClure (93), Lane (81), and Ruggles (133). The percentage of cases below 70 I.Q. is 52, 26 and 35 in these three studies. Mendenhall (96) gives the distribution of I.Q.s for 500 behavior problem cases. The median I.Q. for boys is 82 and for girls 78. Several case studies are added.

The Handicapped. Three reports touch on the intelligence of the deaf. MacKane (89) compares a carefully matched group of hearing and deaf children on three performance scales and one group test. The hearing are superior to the deaf on all tests. The Drever-Collins Performance Scale gives higher mental age ratings for the deaf than do the two American scales. It would seem, therefore, that these lower norms would explain the finding of Drever and Collins in Great Britain of no difference in intelligence between the deaf and the hearing. Guilmartin (51) gives a summary of psychological tests applied to the deaf and is not favorably disposed to some of the work. Goldstein (50) in his book on all sorts of problems connected with the deaf records his opinion that the intelligence of the deaf child does not differ from that of the normal. He presents no data.

Merry (97) gives us a history of intelligence testing among the blind. His distribution of I.Q.s in a typical institution shows 10.7 per cent feeble-minded (below I.Q. 70) and 34.3 per cent dull. Hayes (54) attacks again the old problem of sensory compensation among the blind. They are not superior to the seeing in audiometer tests, nor in a learning test making use of touch and hearing. The I.Q. of 18 blind subjects does not correlate with ability to learn this test. There is no evidence for the heightened sensitivity of the blind in performances where they have had no previous practice.

Physically disabled pupils in Minnesota public schools have a

lower median I.Q. than normal pupils, according to Nilson (110), and his distribution of I.Q.s shows much larger percentages in the dull and backward groups among the handicapped.

Racial Comparisons. Contributions in this field* are few and present nothing materially new. Two are concerned with groups in this country and the rest with groups abroad. Thurmond (156) tests all the twelve-year-old negro children in six southern rural schools. For these 40 cases the mean I.Q. on the Arthur Performance is 84, on the Binet 77, on the Illinois Group Test 69. Telford's (154) tests of 225 mixed-blood Indians in North Dakota give an average I.Q. on the Goodenough Man Test of 88. On the rational learning test they are 1.19 Q below the median of the whites.

Eells (40, 41) presents two articles dealing with the testing of native groups in Alaska. They are below the norms in intelligence, mechanical and musical tests. On the Goodenough Man Test the mean I.Q. of the Eskimo is 90, of the Indian 92, of the Aleut 93. On a modified Binet the I.Q.s are about 10 points lower and the Aleut is again the highest. Porteus (122) in his book on the maze test sums up his findings on racial groups tested in Hawaii and Australia. His rank order of the racial groups is: American, Japanese, Hawaiian, Chinese, Filipino, Portuguese, Australian. Applicants for immigration visas to the United States have been tested at Warsaw by Reichard (125). Many different verbal and performance tests were used. The males were found to be better than the females, those who had some schooling were better than those who had none, Jews were superior to Slavs. Jackson's (63) book dealing with the problems of the Maori mentions the giving of the Haggerty Delta Test in Maori schools. The children score below the norms, but no distribution of scores by age and no M.A.s or I.Q.s are given.

Employment and Guidance. Five reports deal with nurses. Schools for nurses seem to be experimenting with intelligence and other tests for guidance purposes. Bregman's (18) report summarizes the testing done in 57 schools with 10,352 students. The total distribution of the scores is very much like the distribution of scores for high schools, and thus somewhat below college freshmen. Schools vary greatly with reference to the intelligence of their students. Those requiring a four year high school preparation get students of higher intelligence. Jones and Iffert (68) report on 777 students. The intelligence test correlates with theoretical work .48, with practical work .20. Rhinehart's (127)

study with 47 student nurses included a number of tests, none of which correlated with practice marks, and all slightly positive with theory marks. Habbe (52) working with 20 cases finds intelligence scores on the Otis to be of little or no importance, whereas a rating given by a psychologist during an interview correlates .78 with marks, .4 with supervisors' ratings and .8 with general success. Rosenstein (131) finds the intelligence test of value in schools for nurses.

Diehl and Paterson (36) find that Duluth policemen reach the high school freshmen norms on the Pressey Classification Test. Intelligence and rank in technical courses in dentistry correlates only $\pm .1$ according to Schultz (139). Intelligence and efficiency among bank employees correlates from .34 to .57, according to McMurray (95), and the addition of Bernreuter scores adds very little to the correlation. Nine thousand workers in a large manufacturing concern were tested on a modified Army Alpha. Pond (120) gives the medians, Qs and ranges for 44 occupations. The highest medians are for salesmen and laboratory workers and the lowest for press helpers and utility men, but the range within each occupation is very wide. A general discussion of the use of intelligence tests for educational and vocational guidance is presented by Brown (20) with examples from previous studies.

Sex Differences. Four studies bear on the problem of sex differences and all suggest the superiority of the female sex in verbal material or speech. Conrad *et al.* (29) compare the two sexes from ages ten to sixty on the Army Alpha, and find the males inferior on the verbal tests and superior on the arithmetic test. The variability is generally higher for the males. Similarly Heilman (55) in a comparison of 482 girls with 464 boys, age ten, finds no difference in intelligence on the Binet, but the girls are superior in spelling and language usage and the boys are superior in science and arithmetic. But this author finds no differences in variability. Berman and Bird (11), after equating men and women students for intelligence, find that women read faster than men, and Fisher (44) working with preschool children finds that the boys used more incomprehensible remarks than the girls.

Inheritance. The large volume by Schwesinger (140) covers the whole field of heredity and environment particularly as it applies to intelligence and personality tests. It is a splendid reference book for work done in these fields, and in many cases the author assembles the data dealing with a specific topic in very convenient form.

Four studies deal with twins. Newman's (109) seventh case of identical twins reared apart shows a slight advantage in mental tests to the twin brought up in the less cultured environment. After thirteen years apart the twins are practically identical intellectually and "moderately different temperamentally." White's (167) study of 26 pairs of twins gives correlations of .82 for the Binet, .93 for the Kuhlmann-Anderson, and lower correlations for single performance tests. From a summary of tests on twins, Day (32) finds the mean I.Q. for 737 pairs to be 96.8 and suggests that twins may be slightly below normal in intelligence. His correlation for 60 pairs is .72, for 13 identical pairs .92. In the German literature Köhn (75) gives the results of many different tests on twins. He compares the influence of heredity and environment and concludes that they are of equal importance for intellectual qualities. Outhit (111) deals with parent-child resemblance in 51 families. The correlations for I.Q.s between father and child run from .40 to .59, between mother and child from .57 to .69. Between mid-parent and mid-child the correlation is .80.

Four reports deal with the influence of social status on I.Q. Jordan (69) shows the usual increase in I.Q. of child with occupation of father. He uses non-language as well as language tests and concludes that children of mill-workers and farmers are not adequately classified by means of the language group tests. Sherman and Key (144) find very low average I.Q.s on all types of tests for isolated mountain children. They believe that the environment affects intelligence markedly. In Germany, Saller (134) finds the same hierarchy of child's I.Q. with father's occupation, as has been so frequently reported in this country. This is true for two different regions of Germany with a large number of cases in each region. His correlations between I.Q. and size of family for three groups are all negative and low. In Belgium, Delvaux (35) gives the Binet test to 164 children, and finds differences in mentality according to their social class, and these differences he considers mainly due to heredity.

Miscellaneous Topics. Barke (7) attacks the problem of intelligence of bilingual children by giving a verbal and a non-language test to some 600 children in two Welsh mining districts. She finds the monoglots superior by about eight-tenths of a year in M.A. on the verbal test and the bilinguals by about four-tenths of a year in M.A. on the non-language test. She concludes there is no difference in intelligence between the two groups, thus contradicting previous

findings in Wales. Pintner and Forlano (119) report again on the relation between month of birth and intelligence quotient, using over seventeen thousand cases, and they find a slightly lower I.Q. for children born during the winter months. There are correlations between the mean monthly I.Q.s and sunshine, temperature, general mortality and infant mortality. Dawson's (31) study of intelligence and fertility in Scotland shows the usual negative correlations between I.Q. and size of family. Making allowance for the greater mortality among families of low I.Q., they are still leaving more survivors. Finch (43) studies 1,012 pairs of siblings in 614 families with age differences from 1 to 11 years. He finds no correlation between difference in I.Q. of siblings and number of years apart. Anderson and Scheidemann (1) report on three sets of triplets. In one set identity of physical appearance goes along with great similarity in intelligence tests. McClure and Goldberg (94) give test results on a boy of very precocious physical development. The mental tests show him to be about normal. Jersild (65) gives a mass of information about children's fears, dreams, wishes, etc., and indicates any differences which may exist between children of higher or lower I.Q.

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EDUCATIONAL TESTS

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This summary is designed to cover the main developments in educational tests during the year 1933. Because of the large number of studies which have appeared and the limitation of space, it has been found impossible to make the summary as intensive and critical at all points as is to be desired and at the same time sufficiently extensive to include mention of all important contributions. However, by singling out for special attention the newer trends and emphases and by grouping together for brief mention similar studies on the older or more standard problems, the writers have sought to give as clear a view as possible of the activity in the field.

NEW TRENDS AND EMPHASES

The first and probably the most important new problem or trend of interest is that of relating personality and character measurement to achievement and prognostic testing. Stagner (131) finds some evidence to indicate that certain extremes in personality adjustment counterbalance advantages in academic aptitudes. He reports, for example, that extreme emotionality and high self-sufficiency are particularly potent in lowering achievement. Pintner (114) finds significant specialization of interests and attitudes among graduate students of education corresponding to their various professional positions or prospective positions. His results lead him to suggest the possibility that interest and attitudes scales may prove of value in supplementing achievement and intelligence test results as bases for educational and vocational guidance. Watson (162), in an attempt to devise better predictive indices of success of teachers-college students in teaching, experimented with various measures of personality, in addition to intelligence measures and instructors' ratings. On the basis of comparisons of these measures with a fairly satisfactory criterion, he concludes that the personality characteristic which most successfully identifies the members of the least promising group is their more infantile attitude toward their parents. He finds that "drive" is the main distinguishing factor for the most promising

group. Flemming (55) has attempted to predict college achievement from intelligence, personality, and emotional test scores. The correlation between achievement in terms of college grades and Thorndike Intelligence Test scores was found to be .37, while a composite based on the Thorndike Test and the measures of personality and emotions correlated .67 with the grades. Hildreth (71) has constructed for use in guidance work in high schools an interest inventory which is, at least partly, a measure of personality.

The second new trend to be mentioned is that of determining the factors or components of capacity in various fields of educational achievement. This is an emphasis similar to that which has been present in the field of intelligence testing for many years. During the year under review two very important studies dealing primarily with this problem have appeared. Hotelling (79) gives a detailed mathematical analysis of the intercorrelations among certain achievement test scores of seventh-grade children with a view to determining the components of the capacities measured. The test scores used were those of reading speed, reading power, arithmetic speed, and arithmetic power. He concludes that "the chief component seems to measure general ability; the second, a difference between arithmetical and verbal ability. These two account for 83 per cent of the variance. An additional 13 per cent seems to be largely a matter of speed versus deliberation. The remaining variance is trivial." Wilson (171) has sought to determine the degree to which abilities employed and developed in the school subjects are connected by a single factor and the degree to which there are signs of group factors. Three sets of data taken from secondary school certification examinations in England were used. The data consisted of test scores in English, History, Geography, French, Algebra, Geometry, Chemistry, Botany, Art, Handicraft, and Needlework. The method used by Wilson was the Spearman tetrad equation, but he modified Spearman's hypothesis to the extent of assuming that when the tetrad equation is not satisfied the variation is to be explained in terms of group factors. Mathematical subjects were found to constitute a group linked by a common factor over and beyond that of "*g*." There was also quite a good deal of evidence, he says, for a group factor between Art and Handicraft, and some evidence for such a factor for English and French.

In addition to these two studies there is a critical note by Cox (35) concerning the conclusion of Paterson, Elliott, and others to the effect that mechanical ability is a "unique trait." Cox holds that

the evidence presented by these experimenters in their elaborate work of standardizing the Minnesota Mechanical Aptitude Test does not justify their concept of a "unique trait," and he finds fault with their understanding of Spearman's Two-Factor Theory as it would apply to such data as they present.

The third and last trend deserving special mention is the rapidly growing emphasis upon testing at the higher levels of achievement with special stress being placed upon prediction of success in colleges and professional schools. This cannot be called a new trend, but certainly it is one in which there has been a rapidly increasing interest. Twelve articles based on experimental work have appeared during the year on the one problem of predicting success in colleges and professional schools. Moss (107) reports the steadily increasing use of the scholastic aptitude tests for medical students. One group of 1,000 students have been followed over a four-year period of medical work and a second group of 5,000 through three years. On the basis of the comparison of their achievement with data available at the beginning of the medical school work, the experimenter concludes that the aptitude test scores give a somewhat better prediction of what the students can do in medical colleges than any other single measure. Certainly they serve as a valuable supplement to grades in predicting the success of students, and the American Medical Association has been very favorably impressed with their value.

McConn (100) describes briefly plans for coöperative testing programs which are being worked out in several states between the high schools and the state universities whereby better educational guidance is being made possible, especially as it involves entrance to college. The Coöperative Test Service (of which Dr. Ben Wood is Director and with which Dr. McConn is associated) is making important contributions to this work by the construction of tests for both the high school and the college level. The Coöperative Test Service received a subvention of \$500,000 from the General Education Board for use over a ten-year period for the construction of achievement tests. The plan is to build ten or more comparable forms of examinations in the fundamental subject-matter fields of high school and college, and to make one form of these tests available each year. The purpose of constructing the tests is to encourage a wider introduction of testing and guidance programs in the high schools and colleges throughout the country. Closely connected with this plan of testing is a plan for the maintenance of cumulative records, at least over the senior high school period.

Brolyer (14) gives the annual report on the scholastic aptitude tests of the College Entrance Board. This test was given to about 9,000 students in 1933. Its validity coefficient, as determined by its prediction of college grades, is .59. Ferguson (54) has found that students who ranked high in their secondary school, who are young, and who had four years of Latin or Mathematics, are exceptionally good risks in college. Crawford (36) has written a stimulating article on forecasting certain college aptitudes. Reeder (117) studied the value of high school marks, intelligence test scores, and certain subject-matter tests in predicting college success. His conclusion is that the forecasting of educational achievement of the individual is extremely uncertain both in high school and in college. Thurber (151) and Edds and McCall (49) find that high school grades are better for prediction of grades in college than are intelligence test scores. Three other studies which should be mentioned in this section are those of Held (69), Moede (103), and Valentine (158).

Studies dealing with the prediction of success of teachers-college students were made by two investigators. Fritz (57) studied several factors, such as intelligence, aptitude test results, age, teaching experience, and occupations of parents, and found that the only factors which were of value in predicting marks in the teacher-training course were general intelligence and teaching aptitude. The teaching aptitude test (by Bathurst, Knight, Ruch, and Telford) correlated .63 with grades; the American Council Intelligence test correlated .53. Dodd (43) investigated the prognostic value of the Coxe-Orleans test of teaching aptitude. He found that the aptitude test results agreed much more closely with subsequent scholarship grades than with supervisors' ratings.

Studies dealing with prognosis and guidance at levels other than that of college or professional school will be summarized in another section.

DEVELOPMENT AND USE OF TESTS FOR DIAGNOSIS AND REMEDIAL TEACHING

(a) *The Need for More Specific Analysis of Errors in the Construction of Diagnostic Tests.* In studying the validity of diagnostic tests Brueckner (17) finds that a diagnostic test which contains only one test item for each type of difficulty which it purports to cover is not dependable. He gave to a large number of pupils four exercises involving presumably the same type of difficulty in the multiplication of fractions and found that in 40 per cent of the cases only one of the

four examples was solved incorrectly. He concluded that a diagnostic test, if it is to have satisfactory validity, must adequately sample the range of situations in which the skills involved may be used and must, in addition, adequately sample the varying reactions of the learner in the same situation. Pressey and Campbell (115) made a study by means of the interview technique of errors of high school students on a test of capitalization. They find that in most cases the students had reasons for the errors which they made, and in some cases their errors were more logical than the correct usage. Relatively few errors were due simply to carelessness or a temporary lapse. Both of these studies serve to emphasize the fact that the concept of "error" is often general and ill-defined and that frequently the discovery of "the error" which a learner makes is of small value because so little is revealed concerning the more specific mental processes underlying it.

The solution of this problem probably lies partly in the conjoining of the findings and techniques of diagnostic testing with those of physiology. An interesting and illuminating study illustrating some of the possibilities along this line has been made by Selzer (127), who investigated the relation of defective lateral dominance and visual fusion to difficulties in reading, spelling, writing, and speech.

For references to three other articles which should be classified under this section see (169), (170), and (110).

(b) *New Diagnostic Tests*. Gates (59) has prepared and incorporated in one test booklet materials for the detailed diagnosis of serious reading defects. This material is designed for use in tracing back to more remote sources the defects which are revealed by the Gates Silent Reading Test, the Gray's Oral Reading Test, and other first-step diagnostic tests. Such tests as the following are included in the new battery: tests of oral context, of perceptual orientation including reversals, of visual perception, and of auditory perception. A twelve-page individual-record booklet has also been prepared for use in recording facts and interpretations at each step in the diagnosis. Greene and Kelley (64) have presented a silent reading test for grades 4-9, consisting of six sub-tests. The reliability of the sub-tests ranges from .41 to .90. The test is recommended by the authors for diagnostic use. Teegarden (146) has constructed a test which purports to test reversals in reading in grade 1. The reviewers are in some doubt as to whether the test satisfactorily distinguishes between reversals and certain other defects in reading.

(c) *Remedial Teaching*. Traxler (155) describes the derivation

of a battery of silent reading tests and discusses their use in diagnosis and remedial teaching. Gates and Peardon (61) have prepared a very useful set of practice exercises in reading for use in grades 3-6. These exercises are designed to give practice at the points of weakness revealed by the Gates Diagnostic Tests. Jorgensen (86) identifies some of the more important skills necessary in silent reading and suggests several useful tests for the diagnosis of these skills in such a way as to aid in instruction. Farbish (53) reports good results from the use of the McCall-Crabbs Test Lessons in Reading with high school freshmen who were deficient in reading skills. Jacobson (82) in a carefully controlled experiment finds some evidence of specialization of reading ability in different school subjects. For example, in attempting to improve reading ability in general science he finds that the use of reading drills based on the subject-matter in that field is more efficacious than reading material from another field.

Warner and Guiler (161) find that instruction in grammatical usage based on individual diagnosis is much more effective than mass instruction. The investigation was made with pupils of the ninth and tenth grades, and the diagnosis was based on the Guiler-Henry Diagnostic Test. Rodgers (122) and Ransom (116) conducted studies of the value of class drill on the most prevalent errors made by school children in written English. Both studies emphasize the value of drill aimed at specific weaknesses revealed by diagnostic study.

Meyer (101) conducted an investigation involving diagnostic study and remedial work with students in zoölogy. The distinguishing feature of this study was that the diagnosis involved attention not only to deficiencies in subject-matter but also to deficiencies in methods of study, personality adjustments, conditions for study, etc. Remedial instruction adapted to individual difficulties achieved noteworthy results.

A review of the main contribution in the field of diagnostic testing and remedial teaching up to and including the year 1932 has been prepared by Tinker (153). A bibliography of 180 titles is included.

DEVELOPMENT AND USE OF TESTS FOR SURVEY AND EXPERIMENTAL PURPOSES

(a) *Survey Testing.* Crompton,* representing the American Institute of Physics, and Lapp, Farwell, and others (92), representing the American Association of Physics Teachers, enthusiastically approve of the Nation-Wide Testing Program of the Coöperative

* See Lapp and Farwell (92).

Test Service as it applies to the measurement of achievement in physics in high school and college. They point out several benefits which they think will accrue from such testing. Segel (126) presents a review of high school and college coöperative testing programs which are being conducted in sixteen states. He summarizes the purposes of these large-scale programs as follows: to motivate teachers and pupils, to stimulate teachers to stress reasoning rather than bare mastery of textbooks, to yield data to aid in the selection of college entrants, to yield facts for educational and vocational guidance, to yield results for use in the supervision and the accrediting of schools. Caswell (25) discusses school survey techniques and indicates the rôle which educational tests have played in making such surveys increasingly objective.

(b) *Relation of Various Factors to Educational Achievement as Revealed by Tests in Surveys and Experiments.* Five articles dealing with racial differences have appeared during the year. Three of these are by Eells (50, 51, 52) who studied the educational achievement of Eskimo, Aleutian, and Indian children dwelling in Alaska. The children of all these races were markedly below the norm for American children. The inferiority increased with age. In comparing the three races with each other there were only slight differences, but what difference there was indicated the following order from highest to lowest: Aleutian, Indian, Eskimo. In interpreting his results, Eells is not primarily concerned with racial differences. He uses his data to stress the point that modification of the present American curriculum in Alaskan native schools is necessary. Sanderson (123) studied the abilities of children of five national and racial groups on the Seashore and the Kwalwasser-Dykema Music Tests. The results indicate that the groups stand in the following order: Jews, Germans, Italians, Poles, Negroes. Sward (144) compares ten-year-old Jewish and non-Jewish children on many of the same tests which Sanderson used, but fails to find a superiority for Jewish over a random sampling of non-Jewish-American children. He does report, however, that the number of Jews among American musicians of note greatly exceeds the number which would be expected on the basis of population.

Differences between boys and girls in appreciation of literature was studied by Carroll (22). He finds that only about one-third the boys reach or exceed the median of the girls.

The relation of age to school and college achievement was investigated by Moore (105). She finds that the 308 students who gradu-

ated from Pennsylvania high schools in 1928 at age fifteen or less surpassed the average graduate by one-half a S.D. both in achievement and intelligence, and that those who entered college maintained their superiority throughout the course.

The effect of school organization and equipment on achievement has been studied by two investigators. Thompson (149) compared the growth in achievement of a group of children instructed under the Dalton plan with a group under the traditional organization. He found that the children trained by the Dalton plan failed to show any superiority over the other group in spite of the fact that they were somewhat superior in native ability. Stephens (141) studied the relation to educational achievement of such factors as school costs, size of school, rating of school, size of classes, and methods of teaching. The most striking finding of the study is the very slight relationship between achievement and any of the factors listed. The experimenter concludes that much of educational achievement may be attributed to growth attending intellectual maturation and to factors inherent in almost any program of instruction regardless of its supposed excellence and elaborateness.

The effect of participation in athletics upon achievement in college was examined by Cooper (32). From the study of the records of 4,500 seniors who were tested on the Carnegie Foundation Achievement Tests it was found that the athletic group was slightly inferior to the non-athletic.

Hartmann (67) made an elaborate study of the efficiency of three college instructors in teaching educational psychology. He studied the changes in students' achievement, attitudes, and personality traits under the three teachers. His results point to the conclusion that there is a high degree of specificity in teaching ability. According to the test results no one among the three instructors was found to excel the other two in all respects and every one was found to lead in at least one important item tested. Some evidence is given, incidentally, to indicate that students' estimates of their teachers do not agree at all well with objective measures of the average achievement of the students.

The relation of reading ability to all-round achievement in grades 4-6 was investigated by Lee (93). It was found that, after mental ability had been rendered relatively constant, general achievement and reading ability correlated .59 in the fourth grade, .42 in the fifth, and .15 in the sixth. Caldwell (19) examined the effect of speed of reading upon scores obtained on the Stanford Reading Tests. He

worked with seventh-grade pupils. His finding is that removal of the time limit on these tests did not materially affect the scores obtained except in the case of pupils with low intelligence. Noll (108) studied the effect of fatigue attending three hours of continuous work on achievement tests upon the efficiency of college students for further test performance. No evidence was found to suggest that efficiency was lower at the end of the three-hour period than at the beginning. Gates and Bennett (60) compared the plan of giving two weekly tests with that of giving three weekly tests in teaching spelling. The two-test plan proved to be superior. Bird and Beers (11) investigated the effect of much and of little inner speech upon speed of reading of relatively easy material. They find that rate of reading over the range of difficulty studied is distinctly greater under the conditions of small amount of inner speech.

Haggerty (65) summarizes the findings of research studies in higher education which have been carried on at the University of Minnesota.

(c) *New Survey Tests.* Space will not permit a discussion and critical evaluation of the many new tests which have appeared; therefore, with only a very few exceptions, they will simply be listed.

By far the most important and prolific source of new tests is the Coöperative Test Service of the American Council of Education (33). This is an organization conducted under a liberal grant from the General Education Board for the purpose of building new tests on the high school and college levels each year over a period of ten years. Tests are available at present in the following subjects on the college level: English, trigonometry, astronomy, chemistry, physics, zoölogy, geology, economics, history (5 tests), French, German, Spanish, and a few other subjects. On the high school level twenty tests are available covering the principal subjects.

A new and noteworthy set of tests for use in the primary through the junior high school grades has been prepared by Allen, Bixler, Connor, Graham, and Hildreth (5). There are four separate batteries, each covering two or three grades. Norms are given and also rather complete facts on reliability.

The following workers have devised new tests in English or reported progress in the derivation of such tests—English usage: Stalnaker (132–137) and Beck (9); English vocabulary: Downing (44) and O'Connor and Filley (109); prose appreciation: Carroll (23). In a variety of other fields one or two tests have appeared: in arithmetic, Sangren and Reidy (124); in reading,

Pierce (113); in American history, Barr and Daggett (8); in political science, Wesley (164); in attitudes toward current political and economic questions, Whittaker (166); in free-hand drawing, Kline and Carey (89); in free-hand lettering, Miller (102); in sight-singing, Otterstern and Mosher (111); in attitude toward high school, Remmers, Brandenburg, and Gillespie (118); in knowledge of social usage, Strang, Brown, and Stratton (143).

DEVELOPMENT AND USE OF TESTS FOR PROGNOSIS, CLASSIFICATION, GUIDANCE, AND SELECTION

(a) *General.* Thorndike (150) presents a summarized report of an investigation of the educational and vocational careers of 2,500 subjects over a period of approximately ten years. Predictions based on school records and psychological tests when the subjects were fourteen years of age were compared with records of their educational and vocational accomplishments up to age twenty-three. The experimenter's most important finding is that educational careers could be predicted with rather great accuracy, but that it was impossible with the data available to predict vocational careers with anything like satisfactory reliability.

Wood and Beers (172) discuss what they consider to be the "major strategy" in educational guidance. This discussion has significance both because of the challenging idea expressed and because of the key positions held by the authors in the Coöperative Test Service of the American Council on Education. Their idea is that educational guidance is not a process of studying the individual and then adjusting him as well as possible to a relatively static curriculum dictated by those who are not "guidance-minded," but rather a process of adapting the curriculum and all the services of the school to the varying and growing capacities, interests, and needs of individuals which are revealed by tests and follow-up studies. This is for them the major strategy in the use of prognostic test results, and indeed all measurement, for they believe that curricular offerings should grow out of individual diagnosis.

(b) *Guidance in Secondary Schools.* Koos and Kefauver (90) have written an excellent textbook on guidance in secondary education. Allen (3) has outlined a modest guidance program which he feels any high school can undertake. Crawford (37) has leveled several criticisms against the uncritical use of tests and records in educational and vocational guidance. In attempting to predict success in secondary schools, Collier (30) tried tests of arithmetic,

English, and intelligence. Intelligence scores were found to be the most effective of the single test scores and arithmetic the least, but most effective of all was a combination of the three tests. Cureton (39) calls attention to the fact that in attempting to predict success in school or college one is attempting to predict not true success but rather estimates of success which are themselves fallible measures. He devises a formula which, under certain assumptions, will correct for the error here involved of correlating predictive indices against a fallible criterion.

(c) *Determining of Readiness for Entrance to First Grade.* Two studies have appeared which deal with the prediction of success in the first grade of school. Hildreth and Griffiths (73) have devised a valuable test, consisting entirely of picture material, for use in detecting readiness of children for entrance to the first grade. The test correlates .79 with average mental ages derived from three intelligence tests. Danzinger (41) reports the development of tests at the Psychological Institute of Vienna for determining children's fitness for first-grade work. In this investigation attention is given to the measurement not only of mental maturity but also of other factors such as "passive condition," "undisciplined behavior," and "ability to concentrate."

(d) *Predicting Success in Various School Subjects.* Torgerson and Aamodt (154) made a comparative study of the prognostic value of the Lee and the Orleans tests of algebraic ability and the Otis Self-Administering Test of Mental Ability. They find that all three are about equally effective in predicting grades of algebra. Dickter (42) reports rather good results obtained in the predicting of achievement in high school algebra from a composite consisting of an intelligence test, the Rogers test, and teachers' marks. Cooke and Pearson (31) find that the Orleans Prognostic Test in Geometry is not appreciably more accurate in predicting success in geometry than is the Terman Intelligence Test or teachers' marks on algebra. Lee and Lee (94) have devised a new test of geometric aptitude. Richardson (119) used the Symonds Foreign Language Prognosis Test in attempting to predict first-semester grades in modern languages. A correlation of .64 was obtained.

Several studies dealing with the measurement of musical abilities have appeared. Drake (45, 46, 47) has made a critical study of available tests of musical talent and has devised a valuable new test. It consists of four sub-tests: musical memory, interval discrimination, retentivity, and "intuitive feeling" for musical form. In adminis-

tering the tests the examiner presents certain notes, intervals, and phrases on a piano, and the subjects record their responses on simple printed forms. Rather adequate facts on reliability and some facts on validity are presented. Stanton and Koerth (139) present the results of a ten-year program of testing and re-testing with the Seashore tests of musical talent at the Eastman School of Music. One of the most important findings is that the coefficient of contingency between the first and the second administrations of the five tests combined was .61 (maximum=.89) for grades 7-9, and .77 (maximum=.91) for grades 10-12. The experimenters' general conclusion from their evidence is that the Seashore tests have high value as measures of musical talent. Chadwick (26) finds the Seashore tests to be much superior to intelligence and school achievement tests in predicting success in sight-singing.

The value of the Stenquist Mechanical Aptitude Test for predicting shop grades in senior high school was studied by Barden (7). The r was found to be only +.15. Carroll (24) finds that the Meier-Seashore and the McAdory art tests correlate only .27 with each other and that neither shows any considerable agreement with the judgments of university art instructors with regard to the creative art ability of students.

(e) *Use of Tests for Pupil Classification.* Monroe (104) and Cheydleur (28) discuss the use of tests for student placement in college courses in foreign language. Humm and Humm (80) have devised a formula for the automatic classification of pupils from test results. The formula combines the I.Q. and the ratio between the pupil's M.A. and the mean M.A. of the grade. Heilman (68) describes a method of adjusting marks to variations in ability from class to class or section to section. West (165) has made a statistical study on the subject of the effect of homogeneous grouping as practiced in the average elementary school upon variability. He finds naturally, as others have, that much variability remains in each section after "homogeneous" grouping into two or three sections has taken place. Moore (106) describes an adaptation for elementary school use of the American Council Cumulative Record Card for high school and college students. The purpose of this record card is to summarize and preserve facts for individual placement and guidance.

TEACHERS' CLASSROOM TESTS

(a) *Comparison Between Essay-Type and Short-Answer Tests.* This problem has been the subject of six articles during the year.

Sims (128) finds that the reliability of instructors' grading of the essay-type test can be greatly improved by giving them practice in the use of more objective methods of marking. He (129) reports that if, in marking the essay-type test, a scoring key or a system of ratings is used the reliability of the grading is almost as great as in the short-answer test. Chen (27) discusses the relative strengths and weaknesses of the short-answer and the essay tests. Weidemann and Newens (167) found that the reliability of scoring the "compare-and-contrast essay test" * is as great as that of scoring the short-answer test. Gilliland and Misbach (62) find that the short-answer test has appreciably higher reliability than the essay test as they score the latter. Caldwell and Mowry (20) show that the essay-type test penalizes pupils with language handicaps more than does the short-answer test. McClusky (99) argues that the essay-type test measures more important results than the short-answer test. Terry (147, 148) gives some interesting findings which indicate that the essay test stimulates a different kind of study on the part of students from that encouraged by the short-answer test. The former, he says, stimulates the student to look for main points and to endeavor to assimilate subject-matter in large units; the latter stimulates the student to give attention to details and work with small units. Stalnaker and Richardson (138) suggest a method of combining scores from short-answer and essay-type tests.

(b) *Short-Answer Tests.* Of the different types of short-answer tests the true-false has been most frequently studied. This is true both with regard to the year under review and previous years. It seems in general that the true-false test is being placed more and more on the defensive. Two studies deal with the problem of guessing. Hevner (70) has employed the method of having examinees not only mark statements true or false but also indicate the degree of certainty. He obtains greater reliability and validity of test scores when they are calculated on the basis of right answers weighted for degree of certainty than when calculated by the right-wrong formula. Krueger (91) reports that the right-wrong formula gives a rather satisfactory correction for guessing in the case of longer series but is progressively less satisfactory for shorter and shorter series. He worked with series ranging from 10 to 500 items. Briggs and Armacost (13) made a brief study of the efficiency of the oral presentation of true-false tests. They report that such presentation

* The compare-and-contrast test is one composed of questions requiring the supplying of points of comparison or contrast.

compares very favorably with the visual form. Weidemann and Newens (168) stress the importance of adequate directions preceding tests of the true-false and the "indeterminate statement types." Kinney and Eurich (88) present an important summary of 77 articles dealing with the true-false test.

Several articles dealing with the multiple-choice and matching tests have appeared. Scheidemann (125) suggests that the multiple-choice test may be improved by supplying more than one correct response in the suggested answers in some of the questions. Horst (75, 76, 77) has made some interesting mathematical studies of the chance element and the item difficulty in multiple-choice tests. His recommendations serve to emphasize the fact that it is very difficult to construct really satisfactory tests of the multiple-choice type. Zubin (174) studied the chance element in the matching test. To get the most satisfactory correction for guessing he advises the use of many separate matching problems consisting of about five items each, rather than a few long problems or series containing the same total number of items. A formula to correct for guessing is proposed. In attempting to measure knowledge of word meaning, Kelley (87) reports that the multiple-choice and matching tests proved to be more satisfactory than the same-opposite test.

In a study of the analogies test, Vitenson (159) concludes that the selective and inventive forms of the test measure different psychological functions.

PROBLEMS AND TECHNIQUES OF TEST CONSTRUCTION

(a) *Reliability and Validity.* Thurstone (152) has published his lectures on reliability and validity. The most important problems and statistical techniques relative to reliability and validity are concisely discussed. It is interesting to note that Thurstone considers these two concepts to be fundamentally identical. The basic concept, he says, is consistency and the only difference between validity and reliability is that the former refers to the consistency of an index that is generally accepted and one that is new or strange, whereas the latter refers to the consistency of an index with another just like it. Lindquist (97), who has a large responsibility for the constructing of tests in social science for the Coöperative Test Service, maintains that the concept of validity of content in a test is different for the test builder and the curriculum builder. The general achievement test for high schools, he says, must of necessity be largely informational in character and limited to a low level of "understanding and reason-

ing." The reviewers find it impossible to agree fully with these views. In the first place the concept of validity for the test builder and the curriculum builder, at least in the long run, cannot be as divergent as Lindquist implies. If measurement has demonstrable proof on its side—and it always does if it is true measurement—it must in the long run either show that it is validly measuring what the curriculum builders and teachers desire to have measured or else show wherein their demands are hazy or unreasonable. In the second place, the defense for the strong informational content of general achievement tests must rest on facts as to the degree to which informational tests adequately sample the important powers of "understanding and reasoning," not on the assumption that such mental activities are at so low a level in high school that they cannot be measured.

Dunlap (48) holds that the Spearman-Brown method is ordinarily the most satisfactory one for determining the reliability of a test independent of the day-to-day fluctuations of the subjects. Brownell (16), on the other hand, criticizes the use of this method. Cureton (40) has worked out a technique for determining the standard error of the Spearman-Brown formula when used to estimate the length of a test required to yield a given reliability. Watson (163) emphasizes the difference between reliability of status scores at any given time and reliability of measures of change between two test periods. He argues that tests which are designed for use before and after a period of instruction should furnish facts on reliability and validity for change scores as well as for status scores. Ackerson (2) points out an error in Lincoln's criticism that reliability coefficients are unreliable for the task which they are intended to serve. Lincoln (96) replies, reiterating his contention.

(b) *Item Analysis, Scoring Methods, etc.* Capron (21) finds that the order of arrangement of test items—easy-to-hard-, hard-to-easy, or random—makes no difference in the scores of children on tests of spelling, arithmetic problems, and fundamentals of arithmetic. Uhrbrock and Richardson (157) give an excellent demonstration of the importance of item analysis in the construction of tests for predictive purposes. Richardson and Stalnaker (120) call attention to the assumptions of bi-serial r and present a new formula which they claim will frequently be more suitable for use in item analysis. Votaw (160) describes a method of graphical determination of probable error in the validation of test items. Brown, Bartelme, and Cox (15) describe a method of scoring individual performance on

tests scaled according to the theory of absolute scaling. Horst (78) suggests a procedure for obtaining comparable scores on two or more tests. Lindquist and Cook (98) devise a new procedure for controlling the time factor in test evaluation.

TEXTBOOKS AND GENERAL DISCUSSIONS

(a) *Textbooks.* Richardson, Russell, Stalnaker, and Thurstone (121) have prepared in lithographed form a textbook on the theory and the construction of tests. Breed (12) has written a text dealing largely with the application of the contributions of educational measurement to the problems of classroom organization. Garrett and Schneck (58) include a brief discussion of educational tests in their general text on psychological tests. Other books of interest are: Abelson (1), Harter and Smeltzer (66), Chu (29), and T'ang (145).

(b) *Articles and Treatises of General Nature.* Billett (10) has prepared an extensive treatise on individual differences, marking, and promotion. Uhl (156) has discussed what he conceives to be the neglected aspects of educational measurement. These are: measures of problem solving, social competence, creative ability, and aesthetic experiencing. Park (112) has made a check-list of topics in educational measurement. Spence (130) outlines in detail a modest and practical testing program for elementary schools. Wood (173) discusses the uses of examinations. Jones (83, 84) presents an excellent treatise on comprehensive examinations in colleges.

SUMMARIES, REVIEWS, AND BIBLIOGRAPHIES

An unusually large number of summaries and reviews dealing with the development of educational tests over one or more years have appeared in 1933. Practically all these are of high quality but there is a great amount of overlapping among them. It would seem that this duplication of effort might be avoided by a coöperative plan among the several journals which are running such summaries. The references classified by topics are as follows:

General: Jones and Neet (85); Stenquist, Wood, Ruch, Trabue et al. (140); Hildreth (72) (bibliography only). *Diagnostic Testing:* Tinker (153). *Prognosis and Guidance:* Freeman et al. (56); Cowley (34) (bibliography only); Hutson (81) (bibliography only); Allen (4); Strang (142). *Classification:* Brumbaugh (18). *Marks and Marking Systems:* Crooks (38); Ayer (6). *Reading:* Gray (63).

Short-Answer Tests: Lee and Symonds (95). *Techniques of Test Construction:* Holzinger and Swineford (74) (bibliography only).

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CHARACTER AND PERSONALITY TESTS

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Introduction. The present review includes testing techniques and objective studies of character and personality which were published during the year 1933.* The number of studies in this field has been increasing and a number of valuable contributions have been made. The most serious problem at present is still the apparent "gap between character tests and character objectives" (Watson, 252). On one hand, there is a demand for measures of the broad and most crucial aspects of character and personality and a tendency to use questionnaires and personality inventories of dubious validity for this purpose. On the other hand, experiments with painstaking and valid behavior tests led to emphasis on the principle of specificity which resulted in a complete "discrediting of the existence of traits" (Roback, 195).

However, there is some evidence of a revived interest in measures and samplings of behavior and carefully controlled observations. The specificity of the older tests was, at least in part, due to the imperfections of the instruments rather than to the characteristics they purported to measure.

I. TESTS AND TESTING TECHNIQUES

A. *Summaries and Critical Reviews*

Watson (253) presents a summary and bibliography of personality and character tests for the years 1931 and 1932. Schwesinger (208) in her volume on Heredity and Environment (the title is somewhat a misnomer) devotes a chapter to the discussion of personality and character with a bibliography which includes 176 titles. Garrett and Schneck (84) in their book on the methods and results of mental tests discuss and summarize the measurement of personality and temperament, and Kinter (123) presents a comprehensive account of ten tests of artistic abilities. Hildreth (101) in an exhaustive bibliography on

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mental tests has a section on character and personality including 330 titles.

Character and personality tests described in German psychological literature are summarized by Maller (145) and a critical comparison between the German and the American approach to the study of personality is presented by Vernon (247). Critical discussions of the status of character measurement and its future are contributed by Roback (195) and Watson (252), while Allport and Vernon (4) present the results of studies in forms of expression. A comparison between psychometric and the graphological methods is made by Meloun (153). Some limitations of the personality tests are considered by Robinson (197), Allport (3), and Kingsbury (121).

B. Testing Techniques involving Behavior

a. *Conduct of social significance.* (1) Honesty. Loofbourow and Keys (138) devised a test for measuring responses indicative of problem behavior, including an overstatement test. Pressey (186) administered honesty tests to Indian children and to rural white children. James (110) studied honesty as a trait among young people, and Wiersma (259) analyzed the nature of pathological lying. Mathews (150) investigated students' ideas about honesty in examinations and in the preparation of assignments. Jones (117) applied tests of honesty and coöperation in studying the influence of certain types of training on children's behavior.

(2) Sharing. Currier (51) arranged a test situation involving play and food for the measurement of sharing.

(3) Rivalry. Leuba (135) measured individual differences in rivalry in the task of putting pegs of different colors into a peg board.

(4) Aggressiveness. Hausmann (95) utilized the situation of dart throwing to measure aggressiveness, stubbornness and other aspects of personality.

b. *Conduct revealing temperament.* (1) Persistence. Porter (182) reported on an extensive study of some measures of persistence. He used Fernald's Volometer, Morgan Hull Maze Test, a word building test, and a series of self description items concerning persistence. Howells (103) measured persistence in the pressing on a dynamometer, and in responses to pricking with a needle, pinching, heat from an electric grill, and electric shock.

(2) Perseveration. Maller and Elkin (146) have devised a standard perseveration test involving several types of shifts of attention. The manual gives directions and a description of the test.

Cattell (43) presents a comprehensive account of experimentation with temperament tests including measures of perseverance. Rogers (199) reports the use of perseverance tests and the correlation between perseverance and achievement. Shipley (215) reports on a physiological study of perseverance in psychopathic patients.

(3) Suggestibility. Beckham (14) administered tests of suggestibility to delinquents. Marple (149) studied age and sex differences in suggestibility.

(4) Humor. A list of 100 jokes was used by Landis and Ross (133) who studied individual differences in humor and the relationship between humor and certain personality factors. Perl (173) used similar material for the study of the influence of social facilitation on an individual's appreciation of humor.

C. Tests of Emotional Adjustment

1. *Self description tests.* Loofbourow and Keys (138) devised a test including an adjustment questionnaire. Beckman (15) revised the Allport ascendance submission test to be used in business.

Blackman (20) used the Thurstone Schedule in his study of hyperactive children. The Bernreuter test was used by Campbell (33), Carter (39), Hargan (93), Pintner (180), and Rhinehart (193), and was evaluated and described by Bernreuter (16 and 17). The questionnaire of Newmann and Kohlstedt was used by Nagge (162). Other tests of the self descriptive nature were used by Sylvester (241), Symonds (242), and Merry (155). Stagner (228) presents an evaluation of norms on four personality tests. The lack of validity of certain personality inventories is presented by Cahoon (29), Diehl (53), and Roberts (196).

2. *Indirect measures.* (a) The Pressey and its revisions were used by Flemming (75 and 76), Pressey (185), and Newman (163). Situation tests were arranged by Bonte (26) and Zietz (269) in their studies of suggestibility while Hull's postural test was used by Messerschmidt (156 and 157).

3. *Other techniques.* Laboratory techniques were used by Dysinger (63), Hull (105), and Schraiber (206). Subjective diaries and reports were studied by Berrien (19), Dudycha (60), Hartman (94), and Meltzer (154). Ratings on emotional adjustment were used by Flemming (74), Witty (265), Williams (262), and Steinbach (234). Brackett (28) studied behavior involving laughing and Caille (30) studied resistance among young children. Rorschach's ink blot test was used by Beck (12 and 13), Sálás (203),

Shuey (217), and Vernon (249). Downey's Will Temperament test was applied by Dybowski (62).

D. Measures of Attitudes and Interests

1. *Attitudes on social problems.* Racial attitude scales were devised by Zelig and Hendrickson (268), Nystrom (165), and Garrison and Burch (86). Kohler (126) revised the Chicago attitude scale. Harper's questionnaire on international problems was applied by Kolstad (127), and Salner and Remmers (204), while the Newmann-Kulp-Davidson International test was used by Kulp and Davidson (130) in a study of sibling resemblances, and by Campbell and Stover (34) in a study of the teaching of attitudes. Bogardus (24 and 25) suggests the methods of studying group opinion by means of his social distance scale.

2. *Miscellaneous attitudes.* A scale for measuring attitude toward war was devised by Droba (57) and also applied by Cherrington and Miller (46) in a study of changing attitudes. Scales for measuring the attitude of parents toward child behavior were devised by Fitz-Simons (73), and Stogdill (235), and Durea (61) measured attitudes toward juvenile delinquency. Mathews (150) devised a form for studying attitudes toward academic honesty.

A questionnaire for studying the attitudes of radio listeners was devised by Kirkpatrick (124). Thurstone's movie attitude scale was applied by Williams (263) while Peters (175) measured the divergence of motion pictures from current moral standards. Several attitude scales were used by Peterson and Thurstone (177 and 178) in a study of the effect of motion pictures. Remmers and Brandenburg, and Gillespie (191) constructed a scale of attitudes toward school and Kornhauser (128) evaluated five methods of studying employee attitudes.

3. *Beliefs and opinions.* A test for measuring moral attitudes and opinions was constructed by Mira (159). Superstitious beliefs were tested by Maller and Lundeen (147), and Dudycha (58 and 59) devised two lists of questions on superstitious and religious beliefs. A scale for analyzing conflicting ideas in higher education was constructed by Cottrell (49). In a study of prejudice Sinclair and Tolman (222) applied Watson's test of Public Opinion. Bean (10) devised a list of 50 statements for the study of conservative and progressive beliefs and Marple (149) used a list of 75 items on controversial issues for the study of the effect of suggestion and expert opinion.

4. *Interests.* Interest inventories for school personnel work were constructed by Hildreth (99) and Wallace (250). The Strong Vocational Interest blank was used by Carter and Strong (40) in a study of sex differences, and by Strong (238) to measure interest maturity. Bernstein (18) devised a questionnaire for a study of the vocational interests of Jewish and Polish children. The interest blanks of Strong, Brainard and Hepner were compared and evaluated by Anderson (5).

E. Measures of Aptitudes and Informations

Drake (55 and 56) devised four tests of musical ability and Kinter (123) describes ten tests of artistic ability. The McAdory art test consisting of 72 plates is described by Siceloff and Woodyard (219). Sward (239) applied tests of Seashore, Kwalwasser and Drake in a study of musical ability of Jewish children. Carroll (38) reports the correlation between the Meier-Seashore and the McAdory art tests.

Strang, Brown and Stratton (236) devised a test of social usage consisting of 100 true-false items concerning etiquette. The Gates-Strang Health Knowledge test was applied by Feder and Miller (72). The Minnesota Spatial Relations Test was given by Page (166) to subnormal boys and the Moss Nursing Test was employed by Rhinehart (193) to predict success of student nurses.

F. Ratings and Observations

Behavior rating scales were devised and used by Williams (261), Peterson (176), Scherke (205), and Robinson (197). A self rating technique was devised by Luh and Sailer (140). The construction of rating scales is discussed by Richardson and Kuder (194), Pemberton (172), and Robinson (197). A psychobiological balance chart is suggested by Patry (171).

Ratings of socio-economic status were devised by Chapin (44) and McCormick (142). The sampling technique was employed by Robinson and Conrad (198) and Powell (183). Techniques of studying play activities and observations are presented by Boynton (27), Brackett (28), Levy (136), Thomas, Loomis and Arrington (244), Smith (225), Conrad (48), Etziony (70), Hayes (96), and Washburn and Hilgard (251).

G. Miscellaneous Testing Techniques

Ebaugh (64) studied psychoneurotic reactions by means of an association-motor experiment (Luria's technique). Association tests were also used by Gardner (83), Prengowski (184), and Tendler (243). Wittman (264) considers the Babcock test of mental deterioration. The use of the psychogalvanic reflex is reported by Dysinger and Ruckmick (63), Enke (69), Forbes and Landis (77), Schraiber and Yakovleva (206), and Shipley (215). Conditioned responses were used by Ellesor (67), Khozak (119 and 120), and Lundholm (141). Physiological indices were studied by Gaskill (87) and Patrick and Rowles (170). Bonte (26) and Meeves (152) report on eidetic imagery, and studies of expressive movements were made by Allport and Vernon (4), Blake (21), Wolff (267). Westphal (256) applied several tests of motor abilities to stutterers. Graphological methods were employed by Allport and Vernon (4), Cantril, Rand, and Allport (36), Jacoby (109), Meloun (153), Saudek (202), and Seeman and Saudek (211).

Moreno (160) describes a sociometric test to study group organization, and Stauter (233) describes a questionnaire for measuring acquaintanceship. Reed and Weidemann (190) present selected items of a social situation judgment test. Uhrbrock (245) presents his method of analyzing employment interviews. Other approaches to the study of personality are suggested by Jenkins (112), Cameron (32), Landau (132), and Weinberg (255).

II. OBJECTIVE STUDIES IN CHARACTER AND PERSONALITY

A. Aspects of Social Adjustment

1. *Leadership.* Case (41) studies the relationship between personality, social events and leadership. Hicks (98) concludes that leadership is related to adjustment and home background; Jenny (113) studied camp leaders and found them resourceful and well adjusted. Eichler (65) found that social leadership may be improved by instruction in its technique.

Koch (125) found that leadership among children is correlated with compliance and with respect for property rights, and Parten (168) classifies young leaders into two types, the bully and the diplomat. Clem (47) found that leaders in high school make good showing in later years, and Garrison (85) found that leadership correlates low but positively with father's occupation and rating.

2. *Social conduct.* (a) Social responses. Social development of young children was studied by Isaacs (107). Stalnaker (229) found that children under three show little socialized language behavior. Leuba (135) notes three stages in the development of rivalry. Behavior patterns of the preschool child were found to have little constancy by Jersild (114). James (110) concludes that cheating in some form is practiced by high school students. Currier (51) studied sharing behavior and its correlatives. Landis and Ross (133) and Perl (173) studied humor and personality factors.

(b) Play. Boynton (27) found that bright children spend more time in play than dull children. Witty (266) found that mental deviates play in less organized groups. Parten (169) claims that "playing house" is the most social type of play. Updegraff (246) found that clay brings about play of a more sociable and cooperative type than blocks. Friedman (80) found that siblings resemble one another in the type of games and fantasies that they engage in.

3. *Social interactions.* Green (90) found that friendship increases with age, and that girls are more advanced in social development. Seagoe (209) found that propinquity is a strong factor in selecting associates. Moreno (160) concludes that natural groups are formed when people are left to themselves. Cason (42) studied the acts that people find annoying in others. Parten (169) found that the preschool child generally plays in groups of two and that friendship is related to home environment.

4. *Social maladjustment.* (a) Conduct and adjustment of delinquents. Ackerly (2) found that delinquents tend to be emotionally unbalanced and Beckham (14) finds them oversuggestible. Williams (263) found predelinquents to be emotionally and educationally maladjusted. On the other hand, Atwood (8) found delinquents to score high in social participation. Hargan (93) finds no difference between them and normal groups on the Bernreuter, Reusser (192) finds that delinquents consider themselves superior, and Simpson (221) reports that delinquents tend to over-rate themselves.

(b) Background of delinquents. Hodgkiss (102) and Williams (262) found that the broken and irregular home is a factor in delinquency. Selling (212) found that auto thieves come from areas near business districts. Blumer (22 and 23) found that movies are a factor in delinquency in 10 per cent of the males and in 25 per cent of the females. The factor of intelligence in delinquency is studied by Shimberg (213) and Stanger (232).

B. Aspects of Emotional Adjustment

1. *General.* Arkin (7) concludes that dynamic traits are more stable than somatic traits. Patrick and Rowles (170) found a low correlation between personality and health measures. Newman (163 and 164) found that hereditary factors are more significant than environment with regard to temperament, while Saudek (202) and Seeman and Saudek (211) emphasized the influence of environment upon personality and emotional reactions.

2. *Individual differences.* Sex differences in suggestibility are reported by Messerschmidt (156 and 157). Flemming (76) finds no sex differences on his revision of the Pressey test, but Smith (224) finds girls to be more stable in questionnaire responses. Pressey (187, 188, and 189) finds Indian children retarded in emotional development. Enke (69) claims that leptosomes show a higher degree of affectivity than pyknics or athletics. Meeves (152) found dark skinned negroes to be more eidetic, and Gardner (83) found no differences between negroes and whites in the community of ideas.

3. *Adjustments of children.* (a) Normal groups. Personality adjustments were studied by Laycock (134), Symonds (242), Steinbach (234), Shirley (216), Francis (79) and Eliot (66). Only children were found by Witty (265) to be average in health but Campbell (33) found them to be more neurotic. Children's fears were studied by Jersild (115 and 116). Suggestibility was found by Messerschmidt (156 and 157) to increase from the fifth to the eighth grade, and by Bonte (26) to be related to personality factors. Zietz (269) contends that suggestibility is a function of the structure of the whole personality, and Hull, Patten, and Switzer (105) found that positive reactions to suggestions do not evoke a generalized hypersuggestibility.

(b) Children presenting special problems. Miller (158) found two types of problem children, the mobile and the atonic; while Khozak (119 and 120) and Wiersma (259) consider several types. Blackman (20) found greater hyperactivity among problem boys. Adjustment scores of delinquents are presented by Loofbourow and Keys (139) and of pre-delinquents by Dolton (54). Nagge (162) found no excess of introversion among physically handicapped and Merry (155) and Farley (71) found no excessive maladjustment among blind children.

4. *Personality adjustment of college students and adults.* Adjustment of college students was studied by Pallister (167), Hart-

man (94), and Meltzer (154). Berrien (19) found no relationship between dreams and scores on personality tests. Kinter (123) found no difference between college students and artists in emotional stability. Rhinehart (193) found that student nurses score higher in neurotic tendencies than college women.

Beck (11) found that parents of habit clinic children have various personality difficulties, and Pintner (180) found that those who are hard of hearing score high in neurotic tendencies.

5. *Personality of psychopathic patients.* Courtois (50) found no relation between the depression and psychopathology. Dementia praecox patients were found to have retarded associations by Babcock (9), to increase in the inefficiency index with duration of the disease by Schwartz (207), to think in terms of physical causality by Sanders (201), to show less flight of ideas and more incoherence by Prengowski (184), to have a larger frequency of leptosomes and pyknics by Wigert (260), to differ from manics by Hunt and Guilford (106), and to differ from mental defectives in behavior during testing by Piotrowski (181). Smith (223) found no differences between dementia praecox and manics on the Thurstone test; Tendler (243) found that psychoneurotics give less common associations and more individual responses, and Searle (210) found that psychotics show a normal degree of musical appreciation.

C. Educational Adjustment

1. *School achievement.* Educational achievement has been related to personality factors by Stagner (227) and by Weber (254); to perseveration by Rogers (199) and to socio-economic status by Shimborg and Reichenberg (214), Caliver (31), Sward (240), and Maller (144). Hicks (97) found a relationship between leadership and participation in discussions and achievement, and Pintner (179) found a relationship between achievement and interests and attitudes. Emmons (68) reports a positive correlation between skill and self-assurance. McGeoch and Whitely (143) found that learning is associated with submissiveness and with introversion, while Ladd (131) finds little difference in personality between non-readers and readers.

2. *Character education.* Feder (72) found no differences in moral conduct between members of character organizations and non-members. The study of Jones (117) confirms the specificity of behavior. Peters (174) concludes that character growth has three sources: social pressure, personal experience, and vicarious experience.

3. *Aptitudes.* Carroll (37) found that girls excel boys in the appreciation of prose literature. Sward (239) presents evidence of Jewish distinction in music. Strong (237) found little difference between Japanese and whites in motor skills and artistic ability. Westphal (256) found that stutterers score slightly lower than non-stutterers on tests of motor abilities. Page (166) found that sub-normal boys score significantly lower than normal boys on the Minnesota Spatial Relations Test.

D. *Studies in Attitudes and Interests*

1. *Attitudes toward social and political problems.* (a) Social attitudes. Acheson (1) and Bean (10) found a decrease of conservatism with advancement in college studies, and Whittaker (258) found that rural groups are more conservative. Peters (175) and Peterson and Thurstone (177 and 178) and Shuttleworth (218), and Forman (78) found that movies affect social attitudes. Kulp and Davidson (130) report measures of sibling resemblance in social attitudes. Israeli (108) reports uniformity of social attitudes of students.

(b) International and racial attitudes. Education, and propaganda were found to have an effect on attitudes by Campbell and Stover (34), Chen (45), Garrison (86), Nystrom (165), and Cherrington and Miller (46). Zeligs and Hendrickson (268) found a marked correlation between attitudes of Jewish children and adults. Droba (57) found that favorable attitudes toward war is negatively related to socialist views, interest in social science, and foreign parentage.

(c) Miscellaneous attitudes. Williams (263) found favorable attitudes among students toward moving pictures. Stogdill (235) finds that parents and students agree more in their attitudes toward children's behavior than they do with mental hygienists. Ginsburg (88) found relations between parental attitudes and hyperactivity in children. Mathews (150) finds that men are more lenient in their attitudes toward honesty. Hall (92) found that unemployed have a lower morale than the employed. Matthews (151) found that there are many disadvantages of mother's-out-of-the-home employment. Sinclair and Tolman (222) found that instruction in science and mathematics does not affect prejudice and illogical thinking. Stalnaker (231) found that radicalism correlates positively with opposition to intercollegiate athletics.

2. *Interests.* (a) Personal. Cantril, Rand, and Allport (36) and

Manzer (148) found that there was a relation between scores on Allport-Vernon test and interests, and the test was evaluated by Whitely (257).

(b) Educational. Angell (6) found that interest in college work has increased due to the depression. Hildreth (100) found that girls in private schools are more mature and sophisticated. Hoy (104) found that English is the most popular subject in evening school.

(c) Preferences. Rosenzweig (200) studied the relation between age and preference for certain activities. Gale (82) found that children prefer orange, red, violet, and blue. Kirkpatrick (124) studied the preferences for radio programs.

(d) Vocational. Bernstein (18) found Jewish children most interested in intellectual aspects, Polish children in social significance, and neither group interested in the occupation of their parents. Candee (35) found the relation between subjects preferred and choice of vocations. Carter and Strong (40) found that girls are more interested in languages, and boys in natural science.

3. *Judgments.* Davies (52) reports that the traits of a good teacher chosen most frequently were sympathy, humor, and impartiality. Murray (161) found that fear affects estimates of maliciousness. Vernon (248) found that judgments of others are related to artistic ability, while judgment of self depends on intelligence. Gahagan (81) found no evidence for the existence of occupational types, though the judgments based on photographs were more right than wrong.

4. *Beliefs and opinions.* Dudycha (58 and 59) found that the beliefs of seniors do not greatly differ from those of freshman, but that the latter hold more religious beliefs. Maller and Lundeen (147) found that girls believed in more superstitions than boys. Litterer (137) contends that business men do not have a higher concentration of beliefs and stereotypes than do college students. Simpson (220) found similarity between the opinions of prisoners and college students with regard to the relative importance of the ten commandments.

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BOOK REVIEWS

- FRANCIS F. POWERS and WILLIS L. UHL. *Psychological Principles of Education*. New York: The Century Co., 1933. Pp. xvi+570.
- ROBERT M. OGDEN and FRANK S. FREEMAN. *Psychology and Education*. New York: Harcourt, Brace & Co., 1932. Pp. xiv+350.
- S. L. PRESSEY. *Psychology and the New Education*. New York: Harper & Bros., 1933. Pp. xxi+592.
- A. M. JORDAN. *Educational Psychology*. New York: Henry Holt & Co., 1933. Pp. xvii+522.

It is rare that four contemporary books on educational psychology show such marked differences in purposes, points of view and content as these under review. A brief characterization of these volumes will reveal several significant trends in educational psychology at the present time. It will, perhaps, be a good plan to identify these trends before discussing the question whether the existence of "conflicting psychologists" in the basal texts is beneficial or detrimental.

Psychological Principles of Education by Powers and Uhl, is described in the Preface as "a text . . . suitable for normal schools, teachers' colleges, and universities, and written for beginners in educational psychology." It is, however, quite different from most recent texts in educational psychology. In many respects, its content as well as its title show greater resemblance to books on principles of education. The book is divided into four parts: (1) Individual Development in Modern Society; (2) Pedagogical Processes and Procedures; (3) Learning Processes and Curricular Activities, and (4) Psychology of Conduct. In the first part appears a theoretical characterization of education, a discussion of the basis of conduct with emphasis upon the various theories of mind-body relationships, a discussion of mental functions, an analysis and classification of types of motivation, and a treatment of socialization as individual development. Mental processes are treated largely in terms of the functional school: the main categories include sensations, images, imageless thought, imitation, etc. Motivation is classified under such types as economic, social, religious, idealistic, Hedonic, ambitions. The second part includes a chapter on the psychology of

teaching, and another on types of teaching procedure. The third section contains a discussion of the meaning and purpose of curricular pursuits, the psychological issues in the organization of curricula, the principles of learning, and the psychology of the school subjects. The discussion of the principles of learning is confined largely to brief mention of several rival theories, including Gestalt. The last section includes chapters on normal and abnormal conduct.

Throughout the book, the discussion is directed toward educational, sociological and philosophic issues far more than toward psychological. Many topics, such as transfer of training; curves of learning; rate of forgetting; mental, educational and personality testing are given far less space than usual. Few psychological studies are described. The sources appear to be books rather than reports of specific researches. The volume in general may be characterized as reflecting predominantly an interest in educational theory. As such, it is a lucid as well as an authoritative treatment. It can hardly be said, however, to give a comprehensive survey of current psychology or educational psychology.

Psychology and Education by Ogden and Freeman is a revision of a volume of the same title first published by Ogden in 1926, and reviewed in some detail by the present reviewer in the *Journal of Educational Psychology*, December, 1926. Like the original volume, the revision represents a wholehearted acceptance of Gestalt psychology. It includes substantially the same topics as the original book. It contains three main divisions: (1) Original nature of behavior, including discussions of most of the usual "instinctive" forms of behavior such as fear, acquisitiveness, adornment, parental care, play, imitation, etc.; (2) Experience of Behavior, including chapters on perception, affection, the sense-modalities, and memory, and (3) Improvement of Behavior, including chapters on the nature of learning, thinking and willing, and the measurement of intelligence.

This book is almost exclusively devoted to an exposition and defense of Gestalt theory. Experimental results from general and animal psychology are marshalled for this purpose, rather than that of illuminating particular educational practices. The book deals with education only in the most general terms. There is little or no use made of the extensive studies of the school subjects, curricula, methods of school organization, guidance programs, methods of teaching or supervision, types of children, personality problems, and so on. The authors have confined themselves primarily to elucidating Gestalt theory and to pointing out certain general educational impli-

cations. In this purpose, the revision is more successful than the original volume. By means of a better selection of illustrative material, a simplification of style and the elimination of many technical terms, the authors have greatly increased the interest and intelligibility of the volume.

Although these two volumes are similar in that both are primarily concerned with general theory, they are nevertheless so different that mastery of either would leave the other almost a new field. Both contrast markedly, moreover, with Pressey's *Psychology and the New Education*. As stated in the Preface, this author's aim "has been not so much at a systematic presentation of psychological data and theory as at a maximum usefulness in contributions to the understanding of educational problems." Compared to the two preceding books, Pressey's volume represents a radically different attitude toward the value of psychological theory. Whereas Ogden and Freeman, for example, devote nearly a third of their book to a discussion of instinctive behavior, Pressey has eliminated this material almost entirely "without debate." Pressey has no space for theories of learning, transfer, motivation, intelligence, systems of psychology, etc. Such terms as reflex, instinct, Law of Effect and Gestalt do not appear in the index. Instead of principles and theories, the book gives facts, opinions, anecdotes, case studies, and much other concrete and practical data.

The volume is divided into two parts. (1) Development during the School Years, and (2) Learning in School. In the first part, one finds an abundance of facts on such topics as the process of growth; effects of living conditions, physiological habits, recreation and emotional strain on growth; "problems of health" including discussions of sensory defects, malnutrition, diseased teeth, adenoids, etc.; children's interests in play, reading matter, motion pictures, vocations; the influence of "poor" homes and neighborhoods, various types of schools and teachers, churches, adult activities, etc., on behavior; diagnosis of disciplinary and emotional problems; problems of grouping and promotion in schools; the "techniques for the study of individual children."

In the second half of the book, devoted to the general topic "Learning in School," one finds little of the conventional material from animal psychology and less than usual of the discussions of studies of learning telegraphy, typing, nonsense syllables, etc. The author has endeavored to offer data from studies of school activities. Such topics as the following are typical: the course of average

progress in school subjects; analysis of the solution of a picture-puzzle; the use of diagnostic materials in arithmetic; retention of knowledge of a school course; the value of distributed drill; the use of standard and informal tests; eye strain; conditions in the classroom causing fatigue; transfer of training in school subjects; problems in "training to think."

Those familiar with recent books in educational psychology will recognize that most of these topics have appeared in one or more books. They may feel that Pressey's book justifies its Preface claim of being "a sweeping reorganization of the usual treatment," if at all by what it omits rather than by what it contains of new materials or arrangements of content. The wholesale omission of conventional material, especially discussions of theories and principles, leaves a volume almost wholly occupied by "practical" content. In order to carry out the purpose of presenting so exclusively material directly applicable to the teacher's work, the author introduces considerable material based on opinion rather than experimental data. Much of this is in rather popular form, as in the following passage:

. . . "It is largely at school, on the way to and from school, or on the school playground, that children make friends with one another. Many a friendship has developed between pairs of children because they sat next to each other in school. The writer recalls one instance in which a boys' club resulted from the simple fact that a half dozen youngsters rode daily to and from school together on their bicycles. The school not only contributes in these incidental ways, but also makes direct efforts to provide for social life among its pupils. Thus the school play, the classroom party, the Halloween party, the school Christmas tree, furnish opportunity for socialization. Especially in the junior high and high school years is the school a vital background for the flowering of social interests. Club meetings, dances, rehearsals, team practices, parties—all these go on within its walls or under its supervision. And the teacher should realize that in providing for these activities the school is playing a very important part in the social development of its children."

The volume contains considerable material which, usually found in books on hygiene, mental hygiene, methods of teaching, principles of curricula, etc., is rarely treated so fully in texts in educational psychology.

The book includes an unusual number of more or less detailed case studies and personal illustrations, of which the following is typical:

"During the last year the writer has come in contact with a college freshman who stammered. This boy's speech developed at a normal rate until an accident when he was about four years old. While taking a bath, he reached

out of the tub and put his finger into an electric light socket, burning his hand slightly and frightening him a great deal." . . .

Stating in the Preface that he "is very much of an environmentalist," Pressey justifies his purpose to deal extensively with as many environmental influences as possible and to minimize the significance of hereditary factors. While not as extreme as G. B. Watson in his later writings, he approaches nearer to this position than do all, save possibly a few, writers in psychology.

The fundamental question raised by Pressey's book, however, is whether the textbook in educational psychology may profitably dispense entirely or nearly so with the body of psychological principles and theories which have traditionally found a substantial, if not a main part of its substance for the purpose of giving the student a body of basal principles and a consistent, systematic point of view. In making this statement, the reviewer should point out the fact that in this respect the author should not be criticized for failing to accomplish his purpose, since he has deliberately made no attempt to write a systematic account. As he puts it: "The purpose of the book is pragmatic: to give a clear and straightforward interpretation of the facts under discussion in such a fashion as to be of the greatest possible service to a teacher." That he has succeeded admirably in selecting an abundance of facts none is likely to deny. But that a series of such facts is all that one should expect of educational psychology may well be questioned. Such a policy is likely to result in lack of certainty and system in the underlying assumptions and principles. Indeed, Pressey—as the reviewer understands him—practically admits this to be the case as, for example, when he states that "the treatment of learning may seem suggestive of a Gestalt point of view, while in other places there is what may seem a naïve and uncritical use of the concept involved in the 'law of effect.'" One may well doubt whether a string of facts, however practical, which results in a confused and uncritical development of the fundamental principles can ever become the basis of the lasting insight and understanding which psychology, more than any other subject in the teacher's curriculum, should seek to give.

To such a criticism, Pressey could, with considerable justification, reply that while his volume does not attempt to develop the conventional principles of academic psychology, it is designed to produce general conceptions of another sort—practical or professionally useful ideas concerning human conduct as the teacher meets it. It is precisely his point that such are the important outcomes and that the

usual principles of psychology, however valuable they may be to prospective psychologists, are of little service to teachers. Since the present book has adopted this view as wholeheartedly as some others, such as Ogden and Freeman's, have rejected it, we are in a position to investigate the rival viewpoints.

Jordan's *Educational Psychology* is a revision of a volume published in 1928. Although it includes much new material, it is of the same general character and viewpoint as the original text. It follows somewhat the plan frequently referred to as the "Thorndike pattern" of arrangement, including as the major topics Original Nature, Learning, Individual Differences, and Measurement; and treating such topics as fatigue, mental set, etc., as "conditions of learning." Jordan's viewpoint is nearer that of Thorndike than is that of any of the other writers considered in this review. Like Thorndike's texts, the present volume undertakes to develop principles as well as to present facts, and it does not shy off from either merely because it is a little technical. To illustrate, Jordan does not content himself with offering general and easy statements and illustrations of his opinions concerning heredity; he summarizes pertinent experimental data and explains recent theories such as those of T. H. Morgan and Jennings, even if the terms are not found in the four thousand commonest words.

Compared to the other three books, Jordan's volume is the most encyclopedic. While one of the several advanced students who wrote reports on these four books (and the consensus of whose opinion is fairly well conveyed by the present review) perhaps exaggerated when he stated that "anyone who masters this book will know most of educational psychology," he gave the volume its proper relative stamp. It is a fairly thorough survey of the fields most commonly thought of as educational psychology, both fact and theory. The methods of investigation, the borrowings from other fields of psychology, the facts and theories of heredity, instinctive behavior growth, family and environmental factors, individual differences, learning, teaching methods, the school subjects, motivation, psychological and educational tests, statistical methods, transfer, the education and treatment of all sorts of exceptional and handicapped children, fatigue—all these topics and others are included. It is a somewhat more formidable volume than, for example, Pressey's book, as a result of the inclusion of more experimental substance from more areas. Of the four books, Jordan's contains, in the reviewer's opin-

ion, the most ample account of the various schools of psychology as applied to the explanation of learning and other topics.

Here, then, we have four books of very different types, purposes and content, despite the fact that Jordan's book, being more inclusive, overlaps the other three more than they duplicate each other. Which of the four is the *best* textbook in educational psychology? As among the students, all of them prospective teachers of the subject, so among experienced teachers—the reviewer fancies—opinions will differ as the result of many factors. The reviewer agrees with the students that, in general, all four are good books, well written, authoritative, satisfactorily accurate, well organized and documented. To declare that any one is absolutely the best is to assume that they are to be used by a single type of person—a person of a given background, interest, intelligence, and professional need. Even if appraised in terms of "the greatest good for the greatest number" of persons likely to read works on educational psychology, four books so different in character should be viewed as supplementary to, rather than competitive with, each other. The field is now so wide that the four scarcely cover it. They should all be read. The parts that are common to them all are, for that very reason, probably worthy of four-fold review in different form and context.

The diversity in the content of these four contemporary volumes will provide admirably a basis for criticism of specialists in educational psychology for lack of definition of their field or a sense of the relative importance of materials within it. "In Heaven's name," they could urge, "get together and decide what should comprise the introductory course, at least. These books seem to show the field of educational psychology to be almost wholly undefined." With this point of view, the reviewer wishes to disagree. Individuals differ in their needs for textbooks as for all other things. Education includes at least a score of quite different professional services and major interests. Let us have a variety of books as long as each is a good book of its kind. Experimentation with textbooks is an essential part of the development of educational psychology as a useful science. To standardize a subject or a text by a consensus of opinion is to throttle experimentation. Let us have more in order eventually to have better texts. The only textbook deserving of criticism is one which is intrinsically poor or, even worse, which is essentially nothing but a slight variation of another previously published. I think that either of these criticisms cannot be urged against any of these four books.

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BOOKS RECEIVED

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A CORRECTION

The following statement on page 427f. of the article by Brown and Feder in the PSYCHOLOGICAL BULLETIN for June, 1934, seems likely to mislead: "He [Thorndike] makes, however, no reference to the broad literature on this problem . . . the present writers consider it a bad oversight on his part not to have mentioned the work of Lewin on humans. Lewin's experiments, performed in a more systematic theoretical setting than Thorndike's gave identical results and forced Lewin to "identical conclusions." In *The Fundamentals of Learning* (see pages 431 to 436), the valuable work of Lewin is described. As is stated there and on pages 65 and 72, his conclusions and mine are *not* identical.

Brown and Feder apparently wrote the article "Thorndike's Theory of Learning as Gestalt Psychology," without having read *The Fundamentals of Learning*. I will not blame anybody for not reading this book, since it is very long and very dry. It does not seem reasonable, however, that anybody who plans to write or talk about my theories of learning should read it. Indeed I fear that future critics must also read the later monographs and articles.

EDWARD L. THORNDIKE, *Teachers College—Columbia University*.

July, 1934.

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